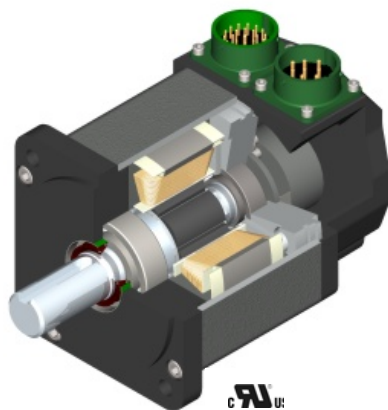
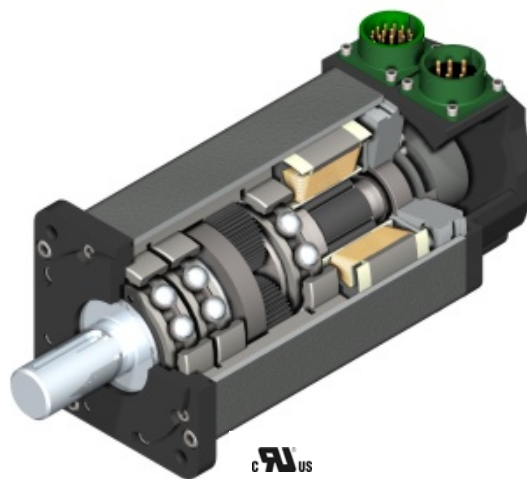


SLM and SLG SERIES BRUSHLESS SERVO MOTOR INSTALLATION AND SERVICE MANUAL



SLM Series Brushless Servo Motor



SLG Series Gearmotor

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TABLE OF CONTENTS

1.0 Introduction	3
1.1 Warranty and Limitations of Liability	3
1.2 Safety Considerations	4
2.0 System Configuration	4
2.1 Typical System Configuration	4
2.2 Feedback Information	4
2.3 Brake	5
3.0 Installation and Operation	7
3.1 Mounting Configurations	7
3.2 Mounting Considerations	7
3.3 Output Torque Ratings	8
3.4 Lubrication Maintenance	8
4.0 Specifications	10
4.1 Electrical/Mechanical Specifications	10
4.2 SLG Series Motor and Gear Stage Inertia	15
5.0 Troubleshooting Procedures	16
5.1 Returning a Product for Repair	17
6.0 Class I Division 2 Option	18
7.0 Certifications	19

1.0 INTRODUCTION

1.1 Warranty and Limitation of Liability

Exlar warrants its product(s) to the original purchaser and in the case of original equipment manufacturers, to their original customer to be free from defects in material and workmanship and to be made in accordance with Exlar's specifications for the product(s) as published at the time of purchase unless otherwise agreed to in writing by an authorized Exlar representative. In no event, however, shall Exlar be liable or have any responsibility under such warranty if the product(s) has been improperly stored, installed, used or maintained, or if Buyer has permitted any unauthorized modifications, adjustments and/or repairs to such product(s). Seller's obligation hereunder is limited solely to repairing or replacing (at its opinion), at the factory any product(s), or parts thereof, which prove to Seller's satisfaction to be defective as a result of defective materials, or workmanship and within the period of time, in accordance with the Seller's stated product warranty (see Terms and Conditions at www.exlar.com), provided, however, that written notice of claimed defects shall have been given to Exlar within thirty (30) days from the date of any such defect is first discovered. The product(s) claimed to be defective must be returned to Exlar, transportation prepaid by Buyer, with written specification of the claimed defect. Evidence acceptable to Exlar must be furnished that the claimed defects were not caused by misuse, abuse, or neglect by anyone other than Exlar.

Components such as seals, wipers, bearings, brakes, bushings, gears, splines, and roller screw parts are considered wear parts and must be inspected and serviced on a regular basis. Any damage caused by failure to properly lubricate Exlar products and/or to replace wear parts at appropriate times, is not covered by this warranty. Uses of components under load to the extent of their expected life according to typical ratings are not covered by this warranty. Any damage due to excessive loading is not covered by this warranty.

Costs for shipment of units returned to the factory for warranty repairs are the responsibility of the customer. Exlar will return ship all warranty repairs or replacements via UPS Ground at no cost to the customer.

For international customers, Exlar will return ship warranty repairs or replacements via UPS Expedited Service and cover the associated shipping costs. Any VAT or local country taxes are the responsibility of the customer.

The foregoing warranty is in lieu of all other warranties (except as Title), whether expressed or implied, including without limitation, any warranty of merchantability, or of fitness for any particular purpose, other than as expressly set forth and to the extent specified herein, and is in lieu of all other obligations or liabilities on the part of Exlar.

Seller's maximum liability with respect to these terms and conditions and any resulting sale, arising from any cause whatsoever, including without limitation, breach of contract or negligence, shall not exceed the price specified herein of the product(s) giving rise to the claim, and in no event shall Exlar be liable under this warranty otherwise for special, incidental or consequential damages, whether similar or dissimilar, of any nature arising or resulting from the purchase, installation, removal, repair, operation, use or breakdown of the product(s) or any other cause whatsoever, including negligence.

The foregoing warranty shall also apply to products or parts which have been repaired or replaced pursuant to such warranty, and within the period of time, in accordance with Seller's stated warranty.

No person including any agent or representative of Exlar, is authorized to make any representation or warranty on behalf of Exlar concerning any products manufactured by Exlar, except to refer purchasers to this warranty.

1.2 Safety Considerations

As with any electro-mechanical device, safety should be considered during the installation and operation of your SLM/G Series brushless servo motor. Throughout this manual you will see paragraphs marked with CAUTION and WARNING signs as shown below.

CAUTION



WARNING



Pay particular attention to these paragraphs. They are intended to provide you with helpful information to ensure safe and trouble-free installation.

2.0 SYSTEM CONFIGURATION

2.1 SLM/G Series Servo Motor System Configuration

The design of the SLM/G Series motor and selection of the proper feedback configuration allows it to be powered by nearly every brand of brushless motor amplifier on the market.

This flexibility allows SLM/G Series motors to be incorporated into the highest performance single and multi-axis motion control systems in use today. In applications varying from food and beverage packaging to multi-axis turning centers to aircraft assembly, these motors show incredible performance and durability.

Each brand of brushless motor amplifiers may have unique wiring requirements, parameter settings and operational principals that affect how the motor operates. Details on connections to specific brands of amplifiers can be obtained from www.exlar.com.



WARNING: Attempting to connect the power cable to the motor feedback connector may cause damage to the connector. Verify that pin patterns match before attempting to connect cables to actuator.

Never attempt to connect or disconnect the motor with power applied. Dangerous voltages are present. Damage to equipment and injury to personnel can result. Many amplifiers have voltage present for a considerable time period after incoming power is removed. Take care to insure that the amplifier has discharged all power.

2.2 Feedback Information

Most SLM/G Series motors incorporate a 2 pole resolver or quadrature incremental encoder with commutation signals as the primary rotary feedback device. The selection of this feedback device is dictated by the amplifier that the end user will use to operate the motor.

Each amplifier has specific requirements for the feedback on the motor. Not all resolver-based amplifiers can use the same resolver, resolver alignment, or relative direction of resolver rotation. Not all encoder-based amplifiers can use the same encoder, encoder alignment or relative direction of encoder rotation.

Many amplifiers offer software that allows the entering of parameters or the downloading of "motor data files" that dictate how the feedback must be set up on the motor. Exlar can provide many of these data files or the proper parameters to enter. Entering motor parameter data to some amplifiers may require assistance from the amplifier manufacturer.

Feedback Alignment

When Exlar manufactures an SLM or SLG Series motor, the proper feedback is selected, mounted, aligned and test run on the amplifier that the customer plans to use, or one that is known to be equivalent for confirming proper feedback alignment and operation. In any case where it is determined that the feedback has become misaligned, or an amplifier change is made requiring the feedback to be aligned differently, it is recommended that Exlar be contacted and arrangements made to have that procedure performed.

Feedback Wiring

The wiring of the feedback device is critical to the operation of the motor with the selected amplifier. Wiring the feedback cable incorrectly can cause unstable operation, incorrect operation or no operation at all. In some cases, improper current limits set in the amplifier along with improper wiring of the feedback cable can lead to damage of the motor.

Resolvers

A resolver is a non-electronic device that works like a small transformer. When rotated, it generates 2 sine waves that are out of phase with one another. By decoding these two sine waves, the amplifier can monitor the direction, revolutions traveled and speed of rotation of the motor. Each sine wave typically represents one revolution of the motor, so the amplifier can also use these signals to know where the motor is within that revolution. By knowing the motor's position, the amplifier can properly time the supply of current and voltage to the motor for it to rotate. This process is **commutation**. For the amplifier to properly commutate the motor, it must have a reference, or zero, point from which to track the motor's rotation. This reference point is critical, and is provided to the amplifier through the proper alignment of the resolver to the phases of the motor during the actuator assembly.

Encoders

An incremental encoder is an electronic rotary device that transmits a string of electrical pulses when rotated. Most brushless motors or servo systems that use incremental encoders use what is called a quadrature encoder. Typical brushless motor encoders use two data channels, labeled A&B, to provide direction, velocity and position information. The Channel labeled I or Z has one pulse per revolution and is called the index. The channels labeled as hall signals or commutation signals are typically labeled S1, S2 & S3; Hall 1, 2 & 3; or Hall A, B & C, depending on the manufacturer's conventions. These signals give the amplifier the commutation information that it needs to properly rotate the motor.

SLM/G Series Feedback Devices

Standard SLM/G Series motors use either resolvers or encoders as their primary feedback device. Depending on the amplifier that will be used to operate the actuator, the hookup of the actuator can vary. Refer to www.exlar.com or contact Exlar for the correct wiring details.

2.3 Internal Holding Brake

Many applications require the addition of the rear internal holding brake. The brake is held open by the supply of power to a magnetic/mechanical clutch. Whenever there is not power to the brake, the armature is held in place which prevents the shaft from moving.

Historically, Exlar motors which had holding brakes provided a transient suppression diode wired internally to the motor. With the changes in servo amplifier and control technology, there are now instances where the diode is not required to be within the motor. An example of this is a control system using a dedicated brake control relay which contains transient suppression components.

Because of this change in technology, Exlar now provides the transient suppression diode separately from the actuator, for inclusion in the brake control circuitry as needed by the end user. A schematic is provided showing the typical use of the transient suppression diode.

If the user is uncertain about their requirements for transient suppression, they should refer to their servo amplifier or controller technical documentation, or contact their servo amplifier or controller manufacturer for technical support.

For connection of your amplifier and actuator (including rear brake lead information) refer to www.exlar.com.

BRAKE SPECIFICATIONS	SLM/G060	SLM/G090	SLM/G115	SLM142	SLM180
Holding torque	18 lb-in	97 lb-in	195 lb-in	354 lb-in	708 lb-in
Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
Current required	0.33 Amps	0.67 Amps	0.75 Amps	1.0 Amps	1.45 Amps



DO NOT attempt to operate the motor with the brake applied. Allowing the motor to operate with the brake applied may cause serious damage to the motor and/or the brake. Do not use the brake to support heavy loads while an operator is under the load. Provide another means to lock the load in position. The brake is a spring applied friction mechanism and does not provide a positive lock.

3.0 INSTALLATION AND OPERATION

3.1 Mounting Configurations

The SLM Series standard mounting configurations and dimensions can be obtained from the product catalog or from our website, www.exlar.com.

The typical fasteners used to mount via the front through holes of the SLM Series actuators are:

SLM 60: M5 or #10 SHCS
SLM 90: M6 or 1/4" SHCS
SLM 115: M8 or 5/16" SHCS
SLM 142: M10 or 3/8" SHCS
SLM180: M12 or 1/2" SHCS

3.2 Mounting Considerations

Every effort should be made to minimize misalignment. Misalignment of the SLM/G Series motor with respect to the load the motor is moving is of great concern. Any misalignment will decrease the life of the components within the motor and also may create problems within the application associated with misalignment. Also, mounting of pulleys and similar devices on the output shaft of the motor imparts side load on the output shaft. The life of the gear stage of the actuator is dependant on side load as shown in the table below. Visit www.exlar.com for more detailed tables.

Radial Load for 10,000 hour bearing life at 25mm from motor face						
		RPM				
		50	100	250	500	1000
SLM/G060	Lbf (N)	195 (867)	155 (690)	114 (507)	90 (400)	72 (320)
SLM/G090	Lbf (N)	389 (1730)	309 (1375)	227 (1010)	180 (801)	143 (636)
SLM/G115	Lbf (N)	939 (4177)	745 (3314)	549 (2442)	435 (1935)	346 (1539)
SLM142	Lbf (N)	1350 (6006)	1071 (4767)	789 (3512)	626 (2788)	497 (2213)



Excessive side load on the output shaft of the motor will dramatically reduce the life of the motor and should be avoided. Side load can be caused from misalignment, loading from devices such as pulleys mounted directly to the output shaft, and from the motor's use in the application.

3.3 Output Torque Ratings

SLG Series gearmotors are equivalent to SLM Series motors with integrated planetary gearing. Consult SLM Series electrical and speed torque data for use with SLG ratios. The maximum allowable output torque for the SLG Series motors is shown below. It is the user's responsibility not to exceed the acceptable output torque of the SLG Series gearmotor.

Output Torque Ratings					
	Ratio	Maximum Static Load	1000 RPM	3000 RPM	5000 RPM
		Lbf-in (Nm)	Lbf-in (Nm)	Lbf-in (Nm)	Lbf-in (Nm)
SLG060	4:1	603 (68.1)	144 (16.2)	104 (11.7)	88 (9.9)
	5:1	522 (58.9)	170 (19.2)	125 (14.1)	105 (11.9)
	10:1	327 (36.9)	200 (22.6)	140 (15.8)	120 (13.6)
	16:1	603 (68.1)	224 (25.3)	160 (18.1)	136 (15.4)
	20:1	603 (68.1)	240 (27.1)	170 (19.2)	146 (16.5)
	25:1	522 (58.9)	275 (31.1)	200 (22.6)	180 (20.3)
	40:1	603 (68.1)	288 (32.5)	208 (23.5)	180 (20.3)
	50:1	522 (58.9)	340 (38.4)	245 (27.7)	210 (23.7)
	100:1	327 (36.9)	320 (36.1)	280 (31.6)	240 (27.1)
SLG090	4:1	2078 (234.8)	600 (67.8)	456 (51.5)	396 (44.7)
	5:1	1798 (203.1)	775 (87.6)	590 (66.7)	510 (57.6)
	10:1	1126 (127.2)	890 (100.6)	680 (76.8)	590 (66.7)
	16:1	2078 (234.8)	912 (103.4)	688 (77.7)	592 (66.9)
	20:1	2078 (234.8)	980 (110.7)	740 (83.6)	640 (72.3)
	25:1	1798 (203.1)	1250 (141.2)	950 (107.3)	825 (93.2)
	40:1	2078 (234.8)	1200 (135.6)	920 (103.9)	800 (90.4)
	50:1	1798 (203.1)	1550 (169.4)	1200 (135.6)	1000 (112.9)
	100:1	1126 (127.2)	1100 (124.3)	1100 (124.3)	1100 (124.3)
SLG115	4:1	4696 (530.4)	1392 (157.3)	1132 (127.9)	1000 (112.9)
	5:1	4066 (459.4)	1445 (163.3)	1175 (132.8)	1040 (117.5)
	10:1	2545 (287.5)	1660 (187.6)	1350 (152.6)	1200 (135.6)
	16:1	4696 (530.4)	2112 (238.6)	1714 (193.0)	1518 (171.0)
	20:1	4696 (530.4)	2240 (253.1)	1840 (207.9)	1620 (183.0)
	25:1	4066 (459.4)	2350 (265.5)	1900 (214.7)	1675 (189.2)
	40:1	4696 (530.4)	2800 (316.4)	2240 (253.1)	2000 (225.9)
	50:1	4066 (459.4)	2900 (327.7)	2350 (265.5)	2100 (237.3)
	100:1	2545 (287.5)	2500 (282.5)	2500 (282.5)	2400 (271.2)

3.4 Lubrication Maintenance

SLG Series gear motors are designed, when used within their standard ratings, to operate for thousands of hours with the initial grease lubrication provided from the factory. Variables such as operating temperature and RMS rotational speed will affect the life of the grease lubrication, and determine the period within which the unit should be re-lubricated.

Please refer to the table next page to determine the hours of operation after which the unit should be re-lubricated, based on operating speed and operating temperature.

Due to the integrated nature of the gear motor product, it is recommended that the unit be sent to Exlar for cleaning, inspection and re-lubrication at the end of the recommended grease renewal period. This can be coordinated by contacting Exlar's RGA Coordinator at 952-368-3434.

Exlar recommends using Mobilith SHC220, a high performance extreme pressure gear grease. The unique physical properties of the synthetic base oil provide outstanding protection against wear, rust, corrosion and high or low temperature degradation. Its operating range is -40 degrees C to 177 degrees C (-40 degrees F to 350 degrees F).

RMS Rotational Speed (RPM)	Recommended Grease Renewal Period (Hours)		
RMS Rotational Speed (RPM)	CASE TEMP 65 deg C (149 deg F)	CASE TEMP 80 deg C (176 deg F)	CASE TEMP 95 deg C (203 deg F)
250	10,000	5,000	2,500
500	8,500	4,250	2,125
1000	6,000	3,000	1,500
1500+	3,500	1,750	875

4.0 SPECIFICATIONS

4.1 Electrical/Mechanical Specifications

SLM/G060													
		1 Stack Motor				2 Stack Motor				3 Stack Motor			
MOTOR STATOR		118	138	158	168	218	238	258	268	318*	338*	358	368*
Sinusoidal Commutation Data													
Continuous Motor Torque	Lbf-in	7.6	7.3	7.0	7.0	11.9	11.5	11.2	11.3	15.3	15.3	14.8	15.0
	(N-m)	(0.86)	(0.83)	(0.79)	(0.79)	(1.35)	(1.30)	(1.27)	(1.28)	(1.73)	(1.73)	(1.67)	(1.69)
Peak Motor Torque	Lbf-in	15.3	14.7	14.0	14.0	23.8	23.0	22.5	22.6	30.7	30.7	29.6	29.9
	(N-m)	(1.72)	(1.66)	(1.58)	(1.58)	(2.69)	(2.60)	(2.54)	(2.56)	(3.47)	(3.46)	(3.34)	(3.38)
Torque Constant (Kt)	Lbf-in/A	2.5	5.2	8.3	9.5	2.5	5.2	8.9	10.2	2.3	5.3	8.8	10.2
(+/- 10% @ 25C)	(N-m/A)	(0.28)	(0.6)	(0.9)	(1.1)	(0.3)	(0.6)	1.0	(1.1)	(0.3)	(0.6)	(1.0)	(1.1)
Cont. Current Rating	A	3.4	1.6	1.9	0.8	5.4	2.5	1.4	1.2	7.3	3.2	1.9	1.6
Peak Current Rating	A	6.9	3.1	3.8	1.6	10.8	4.9	2.8	2.5	14.6	6.5	3.8	3.3
Trapezoidal Commutation Data													
Continuous Motor Torque	Lbf-in	7.3	7.0	6.7	6.7	11.4	11.0	10.7	10.8	14.7	14.6	14.1	14.3
	(N-m)	(0.82)	(0.79)	(0.76)	(0.76)	(1.29)	(1.24)	(1.21)	(1.22)	(1.66)	(1.65)	(1.6)	(1.61)
Peak Motor Torque	Lbf-in	14.6	14.0	13.4	13.4	22.8	22.0	21.5	21.6	29.3	29.3	28.3	28.6
	(N-m)	(1.65)	(1.6)	1.5	(1.5)	(2.6)	(2.5)	2.4	(2.4)	(3.3)	(3.3)	(3.2)	(3.2)
Torque Constant (Kt)	Lbf-in/A	1.93	4.06	6.5	7.41	1.93	4.06	6.90	7.92	1.83	4.11	6.85	7.92
(+/- 10% @ 25C)	(N-m/A)	(0.22)	(0.46)	(0.73)	(0.84)	(0.22)	(0.46)	(0.78)	(0.89)	(0.21)	(0.46)	(0.77)	(0.89)
Cont. Current Rating	A	4.22	1.93	1.15	1.01	6.59	3.02	1.74	1.52	8.96	3.98	2.30	2.02
Peak Current Rating	A	8.44	3.86	2.3	2.02	13.18	6.04	3.47	3.04	17.92	7.96	4.61	4.04
Motor Data													
Voltage Constant (Ke)	Vpk /Krpm	23.9	50.3	80.5	91.8	23.9	50.3	85.5	98.1	22.6	50.9	84.9	98.1
(+/- 10% @ 25C)	Vrms /Krpm	16.9	35.6	56.9	64.9	16.9	35.6	60.5	69.4	16.0	36.0	60.0	69.4
Pole Configuration		8	8	8	8	8	8	8	8	8	8	8	8
Resistance (L-L) (+/-5%@25C)	Ohms	2.62	12.52	35.22	45.79	1.11	5.26	15.95	20.69	0.62	3.14	9.36	12.22
Inductance (L-L) (+/- 15%)	mH	3.1	13.7	35.0	45.5	1.5	6.6	19.0	25.0	0.9	4.4	12.3	16.5
SLM Armature Inertia	lb-in-sec ²	0.000237				0.000413				0.000589			
(+/- 5%)	(kg-cm ²)	(0.268)				(0.466)				(0.665)			
SLM Armature Inertia, Brake	lb-in-sec ²	0.000120				0.000120				0.000120			
	(kg-cm ²)	(0.140)				(0.140)				(0.140)			
Brake Current @ 24VDC	A	.33				.33				.33			
Brake Holding Torque	lb-in	18				18				18			
	(Nm)	(2.2)				(2.2)				(2.2)			
Brake Engage/Disengage Time	ms	14/28				14/28				14/28			
Mechanical Time Constant (tm)	ms	1.41	1.52	1.67	1.67	0.60	0.64	0.67	0.66	0.37	0.37	0.40	0.39
Electrical Time Constant (te)	ms	1.18	1.09	0.99	0.99	1.34	1.25	1.19	1.21	1.42	1.41	1.32	1.35
Damping Constant	lbf-in/krpm	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.05
	(N-m/krpm)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)	(0.006)
Friction Torque	lbf-in	0.07	0.07	0.07	0.07	0.10	0.10	0.10	0.10	0.14	0.14	0.14	0.14
	(N-m)	(0.008)	(0.008)	(0.008)	(0.008)	(0.011)	(0.011)	(0.011)	(0.011)	(0.016)	(0.016)	(0.016)	(0.016)
Bus Voltage	VRMS	115	230	400	460	115	230	400	460	115	230	400	460
Speed @ Bus Voltage	RPM	5000											
Stator Insulation System (Class)	Deg C	180 (H)											
Insulation System Volt Rating	Vrms	460											
Thermal Switch, Case Temp.	Deg C	100											
Environmental Rating SLM Series		IP65											

All ratings at 25 degrees Celsius. For amplifiers using peak sinusoidal ratings, multiply RMS sinusoidal Kt by .707, and peak current by 1.414. Test data derived using NEMA 10" x 10" x 1/4" aluminum heat sink.

4.1 Electrical/Mechanical Specifications

		SLM/G090										
		1 Stack Winding				2 Stack Winding				3 Stack Winding		
MOTOR STATOR		118	138	158	168	218	238	258	268	338	358	368
Sinusoidal Commutation Data												
Continuous Motor Torque	Lbf-in	23.8	24.0	23.7	24.0	39.6	40.0	39.6	40.0	55.8	55.5	55.8
	(N-m)	(2.69)	(2.71)	(2.68)	(2.71)	(4.48)	(4.52)	(4.47)	(4.52)	(6.31)	(6.27)	(6.30)
Peak Motor Torque	Lbf-in	47.6	48.0	47.4	48.0	79.2	80.1	79.1	80.0	111.6	111.0	111.6
	(N-m)	(5.38)	(5.43)	(5.35)	(5.42)	(8.95)	(9.05)	(8.94)	(9.04)	(12.61)	(12.54)	(12.61)
Torque Constant (Kt)	Lbf-in/A	3.2	6.6	11.6	13.3	3.2	6.6	11.6	13.3	6.6	11.6	13.1
(+/- 10%@25C)	(N-m/A)	(0.37)	(0.7)	(1.3)	(1.5)	(0.4)	(0.7)	(1.3)	(1.5)	(0.7)	(1.3)	(1.5)
Cont. Current Rating	A	8.2	4.0	2.3	2.0	13.6	6.8	3.8	3.4	9.5	5.3	4.8
Peak Current Rating	A	16.4	8.1	4.6	4.0	27.3	13.5	7.6	6.7	19.0	10.7	9.5
Trapezoidal Commutation Data												
Continuous Motor Torque	Lbf-in	22.7	22.9	22.6	22.9	37.8	38.2	37.8	38.2	53.3	53.0	53.3
	(N-m)	(2.57)	(2.59)	(2.56)	(2.59)	(4.27)	(4.32)	(4.27)	(4.31)	(6.02)	(5.99)	(6.02)
Peak Motor Torque	Lbf-in	45.4	45.9	45.3	45.8	75.7	76.5	75.6	76.4	106.6	106.0	106.6
	(N-m)	(5.13)	(5.2)	(5.1)	(5.2)	(8.5)	(8.6)	(8.5)	(8.6)	(12.0)	(12.0)	(12.0)
Torque Constant (Kt)	Lbf-in/A	2.53	5.17	9.02	10.34	2.53	5.17	9.02	10.34	5.11	9.07	10.23
(+/- 10%@25C)	(N-m/A)	(0.29)	(0.58)	(1.02)	(1.17)	(0.29)	(0.58)	(1.02)	(1.17)	(0.58)	(1.03)	(1.16)
Cont. Current Rating	A	10.04	4.96	2.80	2.48	16.71	8.27	4.68	4.13	11.65	6.53	5.82
Peak Current Rating	A	20.08	9.92	5.61	4.96	33.42	16.54	9.36	8.26	23.30	13.05	11.64
Motor Data												
Voltage Constant (Ke)	Vpk /Krpm	31.3	64.0	111.7	128.1	31.3	64.0	111.7	128.1	63.4	112.4	126.7
(+/- 10%@25C)	Vrms /Krpm	22.2	45.3	79.0	90.6	22.2	45.3	79.0	90.6	44.8	79.5	89.6
Pole Configuration		8	8	8	8	8	8	8	8	8	8	8
Resistance (L-L) (+/-5%@25C)	Ohms	0.75	3.06	9.57	12.28	0.30	1.21	3.78	4.86	0.69	2.19	2.75
Inductance (L-L) (+/- 15%)	mH	3.7	15.4	78.0	61.5	1.8	7.3	37.2	29.3	4.7	24.7	18.8
SLM Armature Inertia	lb-in-sec ²	0.00054				0.00097				0.00140		
(+/- 5%)	(kg-cm ²)	(0.609)				(1.09)				(1.58)		
SLM Armature Inertia, Brake	lb-in-sec ²	0.00096				0.00096				0.00096		
	(kg-cm ²)	(1.08)				(1.08)				(1.08)		
Brake Current @ 24VDC	A	.67				.67				.67		
Brake Holding Torque	lb-in	97				97				97		
	(Nm)	11				11				11		
Brake Engage/Disengage Time ms		20/29				20/29				20/29		
Mechanical Time Constant (tm) ms		0.51	0.52	0.76	0.52	0.38	0.37	0.54	0.37	0.31	0.44	0.31
Electrical Time Constant (te) ms		5.14	5.02	8.14	5.01	5.93	6.06	9.85	6.04	6.86	11.30	6.86
Damping Constant	lb-in/krpm	0.07	0.07	0.07	0.07	0.12	0.12	0.12	0.12	0.18	0.18	0.18
	(N-m/krpm)	(0.008)	(0.008)	(0.008)	(0.008)	(0.014)	(0.014)	(0.014)	(0.014)	(0.020)	(0.020)	(0.020)
Friction Torque	lb-in	0.20	0.20	0.20	0.20	0.35	0.35	0.35	0.35	0.50	0.50	0.50
	(N-m)	(0.023)	(0.023)	(0.023)	(0.023)	(0.040)	(0.040)	(0.040)	(0.040)	(0.056)	(0.056)	(0.056)
Bus Voltage	VRMS	115	230	400	460	115	230	400	460	230	400	460
Speed @ Bus Voltage RPM		4000										
Stator Insulation System (Class)	Deg C	180 (H)										
Insulation System Volt Rating	Vrms	460										
Thermal Switch, Case Temp.	Deg C	100										
Environmental Rating	SLM Series	IP65										

All ratings at 25 degrees Celsius. For amplifiers using peak sinusoidal ratings, multiply RMS sinusoidal Kt by .707, and peak current by 1.414. Test data derived using NEMA 12" x 12" X 3/8" aluminum heat sink.

4.1 Electrical/Mechanical Specifications (cont'd)

SLM/G115												
		1 Stack Motor				2 Stack Motor				3 Stack Motor		
MOTOR STATOR		118	138	158	168	218	238	258	268	338	358	368
Sinusoidal Commutation Data												
Continuous Motor Torque	Lbf-in	75.8	74.2	74.4	74.2	126.5	123.8	121.6	123.8	174.2	173.1	177.1
	(N-m)	(8.57)	(8.39)	(8.41)	(8.38)	(14.29)	(13.99)	(13.74)	(13.99)	(19.68)	(19.56)	(20.01)
Peak Motor Torque	Lbf-in	151.7	148.5	148.9	148.4	253.0	247.6	243.2	247.6	348.4	346.2	354.2
	(N-m)	(17.14)	(16.77)	(16.82)	(16.77)	(28.58)	(27.98)	(27.48)	(27.98)	(39.36)	(39.11)	(40.02)
Torque Constant (Kt)	Lbf-in/A	4.5	8.7	15.7	17.4	4.5	8.7	15.9	17.4	8.5	15.9	17.6
(+/- 10%@25C)	(N-m/A)	(0.51)	(1.0)	(1.8)	(2.0)	(0.5)	(1.0)	(1.8)	(2.0)	(1.0)	(1.8)	(2.0)
Cont. Current Rating	A	18.7	9.5	5.3	4.8	31.2	15.9	8.6	8.0	22.9	12.2	11.3
Peak Current Rating	A	37.4	19.1	10.6	9.5	62.3	31.8	17.1	15.9	45.8	24.4	22.5
Trapezoidal Commutation Data												
Continuous Motor Torque	Lbf-in	72.4	70.9	71.1	70.9	120.8	118.2	116.1	118.2	166.4	165.3	169.1
	(N-m)	(8.18)	(8.01)	(8.03)	(8.01)	(13.65)	(13.36)	(13.12)	(13.36)	(18.8)	(18.67)	(19.11)
Peak Motor Torque	Lbf-in	144.8	141.8	142.1	141.7	241.6	236.5	232.3	236.5	332.7	330.6	338.2
	N-m	(16.36)	(16.0)	(16.1)	(16.0)	(27.3)	(26.7)	(26.2)	(26.7)	(37.6)	(37.3)	(38.2)
Torque Constant (Kt)	Lbf-in/A	3.53	6.78	12.22	13.55	3.53	6.78	12.37	13.55	6.63	12.37	13.7
(+/- 10%@25C)	(N-m/A)	(0.40)	(0.77)	(1.38)	(1.53)	(0.40)	(0.77)	(1.40)	(1.53)	(0.75)	(1.40)	(1.55)
Cont. Current Rating	A	22.89	11.69	6.50	5.84	38.18	19.5	10.49	9.75	28.04	14.93	13.79
Peak Current Rating	A	45.78	23.38	12.99	11.68	76.36	39.0	20.98	19.18	55.24	29.85	27.18
Motor Stator Data												
Voltage Constant (Ke)	Vpk /Krpm	43.8	83.9	151.4	167.9	43.8	83.9	153.3	167.9	82.1	153.3	169.7
(+/-10% @ 25C)	Vrms /Krpm	31.0	59.4	107.1	118.7	31.0	59.4	108.4	118.7	58.1	108.4	120
Pole Configuration		8	8	8	8	8	8	8	8	8	8	8
Resistance (L-L) (+/-5%@25C)	Ohms	0.21	0.80	2.60	3.21	0.088	0.34	1.17	1.35	0.20	0.69	0.81
Inductance (L-L) (+/-15%)	mH	2.1	7.8	25.5	31.3	1.0	3.8	12.7	15.2	2.4	8.4	10.2
SLM Armature Inertia	lb-in-sec ²	0.00344				0.00623				0.00901		
(+/- 5%)	(kg-cm ²)	3.89				7.036				10.181		
SLM Armature Inertia, Brake	lb-in-sec ²	0.00327				0.00327				0.00327		
	(kg-cm ²)	3.70				3.70				3.70		
Brake Current @ 24 VDC	A	.75				.75				.75		
Brake Holding Torque	lb-in	195				195				195		
	(Nm)	(22)				(22)				(22)		
Brake Engage/Disengage Time ms		25/50				25/50				25/50		
Mechanical Time Constant (tm) ms		0.49	0.51	0.51	0.51	0.37	0.39	0.40	0.39	0.34	0.34	0.33
Electrical Time Constant (te) ms		10.18	9.76	9.81	9.75	11.72	11.23	10.84	11.23	12.27	12.11	12.68
Damping Constant	lbf-in/krpm	0.21	0.21	0.21	0.21	0.35	0.35	0.35	0.35	0.40	0.40	0.40
	(N-m/krpm)	(0.024)	(0.024)	(0.024)	(0.024)	(0.040)	(0.040)	(0.040)	(0.040)	(0.045)	(0.045)	(0.045)
Friction Torque	lbf-in	0.56	0.56	0.56	0.56	1.00	1.00	1.00	1.00	1.20	1.20	1.20
	(N-m)	(0.06)	(0.06)	(0.06)	(0.06)	(0.113)	(0.113)	(0.113)	(0.113)	(0.136)	(0.136)	(0.136)
Bus Voltage	Vrms	115	230	400	460	115	230	400	460	230	400	460
Speed @ Bus Voltage	RPM	3000										
Stator Insulation System (Class)	Deg C	180 (H)										
Insulation System Volt Rating	Vrms	460										
Thermal Switch, Case Temp.	Deg C	100										
Environmental Rating SLM Series		IP65										

All ratings at 25 degrees Celsius. For amplifiers using peak sinusoidal ratings, multiply RMS sinusoidal Kt by .707, and peak current by 1.414. Test data derived using NEMA 12" x 12" x 1/2" aluminum heat sink.

4.1 Electrical/Mechanical Specifications (cont'd)

SLM142										
1 Stack Motor					2 Stack Motor			3 Stack Motor		
MOTOR STATOR	118	138	158	168	238	258	268	358	368	
Sinusoidal Commutation Data										
Continuous Motor Torque	Lbf-in	108.1	106.8	104.4	106.2	179.2	178.2	177.2	236.4	237.5
	(N-m)	(12.21)	(12.07)	(11.79)	(12.00)	(20.25)	(20.13)	(20.02)	(26.70)	(26.83)
Peak Motor Torque	Lbf-in	216.1	213.7	208.8	212.5	358.4	356.3	354.4	472.7	474.9
	(N-m)	(24.42)	(24.14)	(23.59)	(24.00)	(40.50)	(40.26)	(40.04)	(53.41)	(53.66)
Torque Constant (Kt)	Lbf-in/A	5.9	11.8	20.1	23.5	11.8	20.1	23.5	20.1	23.9
(+/- 10%@25C)	(N-m/A)	(0.68)	(1.3)	(2.3)	(2.7)	(1.3)	(2.3)	(2.7)	(2.3)	(2.7)
Cont. Current Rating	A	20.5	10.2	5.8	5.0	17.0	9.9	8.4	13.1	11.1
Peak Current Rating	A	41.1	20.3	11.6	10.1	34.1	19.8	16.8	26.2	22.2
Trapezoidal Commutation Data										
Continuous Motor Torque	Lbf-in	103.2	102.0	99.7	101.4	171.1	170.1	169.2	225.7	226.8
	(N-m)	(11.66)	(11.53)	(11.26)	(11.46)	(19.34)	(19.22)	(19.12)	(22.50)	(22.62)
Peak Motor Torque	Lbf-in	206.4	204.1	199.4	202.9	342.3	340.3	338.4	451.4	453.5
	(N-m)	(23.32)	(23.1)	(22.5)	(22.9)	(38.7)	(38.4)	(38.2)	(51.0)	(51.2)
Torque Constant (Kt)	Lbf-in/A	4.58	9.16	15.71	18.33	9.16	15.71	18.33	15.71	18.66
(+/- 10%@25C)	(N-m/A)	(0.52)	(1.04)	(1.77)	(2.07)	(1.04)	(1.77)	(2.07)	(1.77)	(2.11)
Cont. Current Rating	A	25.16	12.44	7.09	6.18	20.87	12.10	10.32	16.05	13.58
Peak Current Rating	A	50.33	24.88	14.18	12.37	41.73	24.20	20.63	32.11	27.16
Motor Stator Data										
Voltage Constant (Ke)	Vpk /Krpm	56.8	113.5	194.6	227.1	113.5	194.6	227.1	194.6	231.1
(+/-10% @ 25C)	Vrms /Krpm	40.1	80.3	137.6	160.6	80.3	137.6	160.6	137.6	163.4
Pole Configuration		8	8	8	8	8	8	8	8	8
Resistance (L-L) (+/-5%@25C)	Ohms	0.21	0.87	2.68	3.52	0.36	1.01	1.39	0.61	0.86
Inductance (L-L) (+/-15%)	mH	5.4	21.7	63.9	87.0	10.4	30.5	41.5	20.0	28.2
SLM Armature Inertia	lb-in-sec ²	0.00927				0.01537			0.02146	
(+/- 5%)	(kg-cm ²)	10.47				17.36			24.25	
SLM Armature Inertia, Brake	lb-in-sec ²	.008408				.008408			.008408	
	(kg-cm ²)	(9.5)				(9.5)			(9.5)	
Brake Current @ 24 VDC	A	1.0				1.0			1.0	
Brake Holding Torque	lb-in	354				354			354	
	(Nm)	(39.99)				(39.99)			(39.99)	
Brake Engage/Disengage Time ms		25/73				25/73			25/73	
Mechanical Time Constant (tm) ms		0.79	0.81	0.85	0.82	0.52	0.53	0.54	0.45	0.45
Electrical Time Constant (te) ms		25.59	25.02	23.88	24.73	30.58	30.22	29.89	32.60	32.90
Damping Constant	lb-in/krpm	0.60	0.60	0.60	0.60	0.80	0.80	0.80	1.20	1.20
	(N-m/krpm)	(0.068)	(0.068)	(0.068)	(0.068)	(0.090)	(0.090)	(0.090)	(0.136)	(0.136)
Friction Torque	lb-in	1.50	1.50	1.50	1.50	1.75	1.75	1.75	2.00	2.00
	(N-m)	(0.17)	(0.17)	(0.17)	(0.17)	(0.20)	(0.20)	(0.20)	(0.23)	(0.23)
Bus Voltage	VDC	115	230	400	460	230	400	460	400	460
Speed @ Bus Voltage	RPM	2400								
Stator Insulation System (Class)	Deg C	180 (H)								
Insulation System Volt Rating	Vrms	460								
Thermal Switch, Case Temp.	Deg C	100								
Environmental Rating SLM Series		IP65								

All ratings at 25 degrees Celsius. For amplifiers using peak sinusoidal ratings, multiply RMS sinusoidal Kt by .707, and peak current by 1.414. Test data derived using NEMA 12" x 12" x 1/2".

4.1 Electrical/Mechanical Specifications (cont'd)

		SLM180							
		1 Stack Motor			2 Stack Motor			3 Stack Motor	
MOTOR STATOR		138	158	168	238	258	268	358	368
RMS Sinusoidal Commutation Data									
Continuous Motor Torque	Lbf-in	254.7	249.9	252.6	424.8	423.0	427.5	595.6	611.6
	(N-m)	(28.78)	(28.23)	(28.53)	(47.99)	(47.80)	(48.30)	(67.29)	(69.10)
Peak Motor Torque	Lbf-in	509.4	499.8	505.2	849.6	846.0	855	1191.2	1223.2
	(N-m)	(57.55)	(56.47)	(57.08)	(95.99)	(95.59)	(96.6)	(134.59)	(138.2)
Torque Constant (Kt)	Lbf-in/A	12.6	21.8	25.2	12.6	21.8	25.2	21.4	25.2
(+/- 10%@25C)	(N-m/A)	(1.42)	(2.46)	(2.84)	(1.42)	(2.46)	(2.84)	(2.42)	(2.84)
Cont. Current Rating	A	22.6	12.8	11.2	37.7	21.7	19.0	31.1	27.2
Peak Current Rating	A	45.2	25.6	22.4	75.5	43.4	38.0	62.2	54.3
Trapezoidal Commutation Data									
Continuous Motor Torque	Lbf-in	242.7	238.6	241.2	405.7	404.0	408.3	568.7	584.0
	(N-m)	(27.42)	(26.96)	(27.25)	(45.83)	(45.64)	(46.13)	(64.26)	(65.98)
Peak Motor Torque	Lbf-in	485.4	477.2	482.4	811.4	808.0	816.6	1137.4	1168.0
	N-m)	(54.84)	(53.92)	(54.5)	(91.68)	(91.29)	(92.26)	(128.51)	(131.97)
Torque Constant (Kt)	Lbf-in/A	9.8	17.0	19.6	9.8	17.0	19.6	16.7	19.6
(+/- 10%@25C)	(N-m/A)	(1.11)	(1.92)	(2.22)	(1.11)	(1.92)	(2.22)	(1.88)	(2.22)
Cont. Current Rating	A	27.7	15.7	13.7	46.2	26.5	23.3	38.1	33.3
Peak Current Rating	A	55.3	31.4	27.5	92.4	53.1	46.5	76.2	66.5
Motor Stator Data									
Voltage Constant (Ke)	Vpk /Krpm	85.9	148.9	171.8	85.9	148.9	171.8	146.1	171.8
(+/-10% @ 25C)	Vrms /Krpm	121.5	210.6	243.0	121.5	210.6	243.0	206.6	243.0
Pole Configuration		8	8	8	8	8	8	8	8
Resistance (L-L) (+/-5%@25C)	Ohms	0.3	1.0	1.3	0.13	0.41	0.5	0.23	0.3
Inductance (L-L) (+/-15%)	mH	8.3	24.8	33.0	3.9	11.8	15.8	7.5	10.3
SLM Armature Inertia	lb-in-sec ²	0.0427			0.0758			0.1089	
(+/- 5%)	(kg-cm ²)	48.25			85.65			123.04	
SLM Armature Inertia, Brake	lb-in-sec ²	0.02815							
	(kg-cm ²)	(31.8)							
Brake Current @ 24 VDC	A	1.45							
Brake Holding Torque	lb-in	708							
	(Nm)	(80)							
Brake Engage/Disengage Time	ms	53/97							
Mechanical Time Constant (tm)	ms	5.0	5.1	5.0	2.0	2.1	2.0	1.2	1.2
Electrical Time Constant (te)	ms	5.5	5.7	5.6	2.3	2.3	2.3	1.4	1.3
Damping Constant	lb-in/krpm	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
	(N-m/krpm)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)	(3.16)
Friction Torque	lb-in	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	(N-m)	(4.52)	(4.52)	(4.52)	(4.52)	(4.52)	(4.52)	(4.52)	(4.52)
Bus Voltage	VDC	230	400	460	230	400	460	400	460
Speed @ Bus Voltage	RPM	2400							
Stator Insulation System (Class)	Deg C	180 (H)							
Insulation System Volt Rating	Vrms	460							
Thermal Switch, Case Temp.	Deg C	100							
Environmental Rating SLM Series		IP65							

All ratings at 25 degrees Celsius. For amplifiers using peak sinusoidal ratings, multiply RMS sinusoidal Kt by .707, and peak current by 1.414. Test data derived using NEMA 12" x 12" x ½".

4.2 SLM Series Motor and SLG Series Gearmotor Stage Inertia

SLM/G060							
Stator		1 Stack		2 Stack		3 Stack	
SLM Armature Inertia lb-in-sec ² (kg-m ²)		0.000237	(0.268)	0.000413	(0.466)	0.000589	(0.665)
SLM Brake Inertia lb-in-sec ² (kg-m ²)		0.000120	(0.140)	0.000120	(0.140)	0.000120	(0.140)
SLG Armature Inertia lb-in-sec ² (kg-m ²)		0.000226	(0.255)	0.000401	(9.453)	0.000576	(0.651)
Reflected Inertias	Single Reduction		Reflected Inertias	Double Reduction			
Gear Stages	lb-in-sec ²	(kg-cm ²)		lb-in-sec ²	(kg-cm ²)		
4:1	0.0000132	(0.0149)	16:1	0.0000121	(0.0137)		
5:1	0.0000087	(0.00984)	20:1, 25:1	0.0000080	(0.00906)		
10:1	0.0000023	(0.00261)	40:1, 50:1, 100:1	0.0000021	(0.00242)		

SLM/G090							
Stator		1 Stack		2 Stack		3 Stack	
SLM Armature Inertia lb-in-sec ² (kg-m ²)		0.00054	(0.609)	0.00097	(1.09)	0.00140	(1.58)
SLM Brake Inertia lb-in-sec ² (kg-m ²)		0.00096	(1.08)	0.00096	(1.08)	0.00096	(1.08)
SLG Armature Inertia lb-in-sec ² (kg-m ²)		0.00114	(1.29)	0.00157	(1.77)	0.00200	(2.26)
Reflected Inertias	Single Reduction		Reflected Inertias	Double Reduction			
Gear Stages	lb-in-sec ²	(kg-cm ²)		lb-in-sec ²	(kg-cm ²)		
4:1	0.000154	(0.174)	16:1	0.000115	(0.130)		
5:1	0.000100	(0.113)	20:1, 25:1	0.0000756	(0.0854)		
10:1	0.0000265	(0.0300)	40:1, 50:1, 100:1	0.0000203	(0.0230)		

SLM/G115							
Stator		1 Stack		2 Stack		3 Stack	
SLM Armature Inertia lb-in-sec ² (kg-m ²)		0.00344	(3.89)	0.00623	(7.036)	0.00901	(10.181)
SLM Brake Inertia lb-in-sec ² (kg-m ²)		0.00327	(3.70)	0.00327	(3.70)	0.00327	(3.70)
SLG Armature Inertia lb-in-sec ² (kg-m ²)		0.00538	(6.08)	0.00816	(9.22)	0.0109	(12.37)
Reflected Inertias	Single Reduction		Reflected Inertias	Double Reduction			
Gear Stages	lb-in-sec ²	(kg-cm ²)		lb-in-sec ²	(kg-cm ²)		
4:1	0.000635	(0.717)	16:1	0.000513	(0.580)		
5:1	0.000428	(0.484)	20:1, 25:1	0.000350	(0.396)		
10:1	0.000111	(0.125)	40:1, 50:1, 100:1	0.0000911	(0.103)		

SLM142 (Geared motor (SLG) not available in 142 frame)							
Stator		1 Stack		2 Stack		3 Stack	
SLM Armature Inertia lb-in-sec ² (kg-cm ²)		0.00927	(10.47)	0.01537	(17.36)	0.02146	(24.25)
SLM Brake Inertia lb-in-sec ² (kg-cm ²)		.008408 (9.5)					

SLM180 (Geared motor (SLG) not available in 180 frame)							
Stator		1 Stack		2 Stack		3 Stack	
SLM Armature Inertia lb-in-sec ² (kg-cm ²)		0.0427	(48.25)	0.0758	(85.65)	0.1089	(123.04)
SLM Brake Inertia lb-in-sec ² (kg-cm ²)		.02814 (31.8)					

5.0 TROUBLESHOOTING PROCEDURES

This section provides you with guidelines and hints on troubleshooting various problems that may be encountered during installation and operation of your Exlar SLM/G Series motor.

Symptom / Trouble	Possible Cause / Troubleshooting Procedure
No response from motor.	1. Check amplifier for faults that may indicate problem. 2. Check to insure that amplifier is enabled 3. Check for proper wiring
Motor seems to be enabled (receiving current) but is not operating or is operating erratically.	1. Amplifier may be improperly tuned. Check all gain settings. If a motor file or parameters specific to your amplifier/motor combination have been supplied by Exlar, be sure that they are entered or downloaded properly. 2. Amplifier may be set up improperly for the particular motor being used. Check amplifier settings for number of poles, voltage, current, resistance, inductance, inertia, etc. 3. Feedback wiring may be incorrect. 4. Feedback conductors touching, or feedback cable may be damaged. 5. Motor phases are wired incorrectly or in incorrect order. (R,S,T) 6. Feedback (resolver or encoder) is improperly aligned. Contact Exlar.
Motor cannot move load.	1. Load is too large for the capacity of the motor or too much friction is present. 2. Excessive side load. 3. Misalignment of output shaft to load. 4. Amplifier has too low of current capacity or is limited to too low of current capacity.
Motor housing moves or vibrates when shaft is in motion.	1. Check motor mounting. Insure that the motor is securely mounted. 2. Amplifier is improperly tuned (wrong gain settings.) Tune amplifier.
Motor is overheating.	1. Insufficient cooling for application requirements. Contact Exlar engineering. 2. Motor is being operated outside of continuous ratings. 3. Amplifier is poorly tuned causing excessive unnecessary current to be applied to motor. Check Gain settings.

5.1 Returning a Product for Repair

STANDARD REPAIR LEADTIME:

- Two weeks for written evaluation from Exlar
- Two weeks from receipt of approval (by fax or email) for repair where parts are available.
- An evaluation charge per unit after evaluation applies if customer chooses not to repair; or if product is found not in need of repair.

EXPEDITED REPAIR LEADTIME:

- An expedite charge per unit can be quoted.
- This provides one week for written evaluation from Exlar
- This provides one week from receipt of approval (by fax or email) for repair where parts are available.

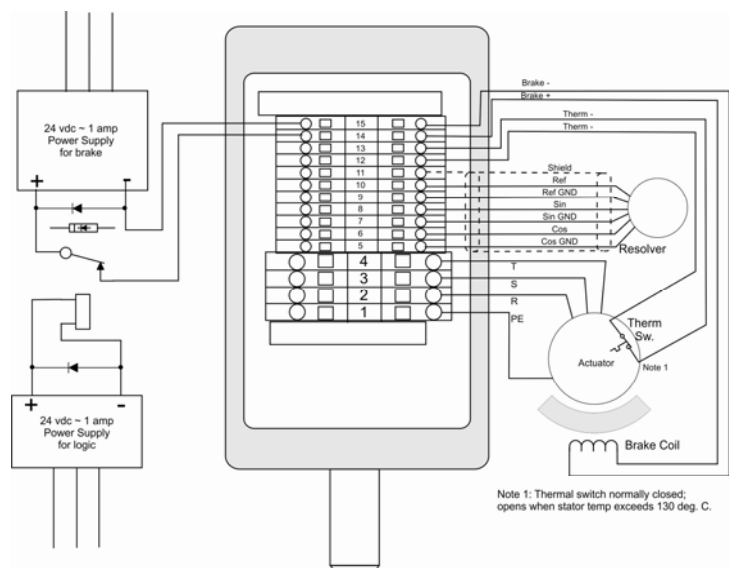
PROCEDURE:

- Please discuss the return with Exlar Technical Support prior to requesting an RGA number to see if it is possible to resolve the issue prior to return.
- If it is determined that an RGA number is required, please do so by contacting the Returned Goods Administrator. Phone 952-500-6200 or email returns@exlar.com.
 - International Repairs: Closely follow instructions provided by the Exlar Returned Goods Administrator. Failure to comply with issued instructions may result in delays for repair and return.
- Exlar requires a purchase order at the time of RGA; \$0 on warranty returns, or for the standard evaluation charge per unit on all non-warranty units for the evaluation fee.
- Following the evaluation, you will receive a quote from Exlar on the charges that will apply. If the actuator repair is approved, the evaluation fee will be waived and we will request an amended PO for the actual repair value.

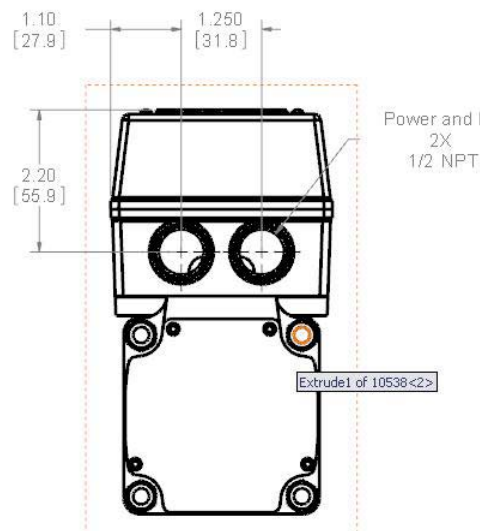
6.0 CLASS I DIVISION 2 OPTION

Class I division 2 products are provided with an electrical box containing terminal strips for customer wiring access. The electrical box has two ½-NPT ports for customer conduit connection. It is the responsibility of the installer to insure that the interconnecting wire, cabling and conduit meet any local or regional required electrical codes and standards.

6.1 Terminal Box Wiring Diagram



6.2 Terminal Box Dimensions



7.0 EC CONFORMANCE CERTIFICATION

Declaration of Conformity

(according to ISO/IEC 17050-1 and ISO/IEC 17050-2)

Manufacturer's Name: Exlar Corporation

Manufacturer's Address: 18400 West 77th Street
Chanhassen, MN 55317
USA

declares, that the product:

Product Name: GSX, GSM, SR, SLM, SLG Series
(Complete Model Listing Below)

Models: **GSX20, GSX30, GSX40, GSX50, GSX60,
GSX90, GSX115
SR21, SR31, SR41
SLM060, SLM090, SLM115, SLM142, SLM180
SLG060, SLG090, SLG115
GSM20, GSM30, GSM40**

to which this declaration relates, **meets the essential health and safety requirements** and is in conformity with the relevant EU Directives listed below:

**EU EMC Directive 2004/108/EC
EU Low Voltage Directive 2006/95/EC**

using the relevant section of the following EU standards and other normative documents:

EMC: EN 55014-1: 2006
EN 55014-2: 1997 + A1: 2001 + A2: 2008

Safety: EN 60034-1: 2004

October 29th, 2004
Date of issue


Chief Technology Officer

European Contact:

**Exlar GmbH
Frankfurter Str. 107
65479 Raunheim, Germany**

Certificate of Compliance

Certificate Number 20111220 – E225288A
Report Reference E225288 – 2002 May 30
Issue Date 2011 December 20

Page 1 of 1



Issued to: **EXLAR CORP**
18400 W 77TH ST
CHANHASSEN, MN 55317 USA

This is to certify that **Servo and Stepper Motors**
representative samples of

Permanent Magnet servo motors, SLG or SLM Series, Model SLG or SLM; followed by 060, 090, 115, 142, or 180; followed by 04, 05, 10, 16, 20, 25, 40, 50, 100 or X; followed by K, R or X; followed by A, B, C, D, E, I, J, M, P, T or X; followed by E, F, G or X; followed by B or S; followed by three letters or numbers; followed by 1, 2, 3 or X; followed by A, B, C, 1, 3, 5, 6 or X; followed by 6 or 8; may be followed by 01 through 99, HC, HW, MW, NI, RD, SD, SS, XF, XH, XM, N4, XT or XL; may be followed by 00000 through 99999.

Have been investigated by Underwriters Laboratories in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: **ANSI/UL 1004-1, "Rotating Electrical Machines - General Requirements" and CSA-C22.2 No. 100, "Motors and Generators."**

Additional Information: See UL On-line Certification Directory at WWW.UL.COM for additional information.

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements. The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark:  may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada:  and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Look for the UL Recognized Component Mark on the product

William R. Carney
Director, North American Certification Programs

Underwriters Laboratories Inc.

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

For questions, please contact a local UL Customer Service Representative at <http://www.ul.com/global/eng/pages/corporate/contactus>